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10/509,850	09/30/2004	Gerard Barbezat	015258-063900US	4308
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EXAMINER BAREFORD, KATHERINE A				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/509,850

Applicant(s)

BARBEZAT ET AL.

Examiner

Katherine A. Bareford

Art Unit

1792

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-24 and 28-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-24 and 28-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S5108)
- Paper No(s)/Mail Date 6/30/08
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. The petition to revive the application of December 18, 2007 has been granted as noted by the Petition decision of April 30, 2008.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on Feb. 28, 2007 has been entered.

The amendment filed December 18, 2007 with the petition to revive has been received and entered. With the amendment, claims 1-11 and 25-27 are canceled, and claims 12-24 and 28-42 are pending for examination.

Specification

3. The substitute specification filed July 21, 2006 has not been entered because it does not conform to 37 CFR 1.125(b) and (c) because:

The substitute specification contains (1) an improper incorporation by reference. See paragraph [0001]. The US Patent No. 5,853,815 was not previously incorporated by reference so it cannot be incorporated by reference at this point.

The substitute specification also contains (2) new matter. At paragraph [0006] the reference to “Lower-density or material-deficient” transitional zones is new matter. This does not correspond to the previously described “low material” transitional zones (which as previously noted was confusing as to what the term meant). This new matter is also present in paragraph [0014].

4. The abstract of the disclosure filed July 21, 2006 is objected to because the newly filed abstract contains new matter.

The reference to the “material-deficient zones” contains new matter as discussed in the paragraph above.

Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities: (1) at page 3, line 13; and page 4, lines 6 and 9; applicant needs to remove references to the claims. (2) headings, such as BRIEF DESCRIPTION OF THE DRAWINGS, SUMMARY OF THE INVENTION, etc. should be provided where appropriate in the specification.

Appropriate correction is required.

This objection remains because as discussed in paragraph 3 above, the substitute specification of July 21, 2006 has not been entered.

6. As to paragraphs 3-5 above, applicant has provided arguments in the amendment of December 18, 2007. (1) as to the argument regarding the improper incorporation by reference, applicant has amended page 1 of the originally filed specification such that no reference is made to incorporation by reference. The Examiner notes this amendment, which has been entered. However, this does not affect the substitute specification. A substitute specification is a single paper that is either entered or not entered. It is not "entered-in-part" which appears to be what the applicant is arguing for the Examiner to do. (2) As applicant's arguments that the reference to "Lower-density or material-deficient" is supported by the disclosure as filed, the Examiner disagrees. The terms have a different meaning than "low material", and applicant has provided no showing as to why one of ordinary skill in the art would understand that this is what is meant by the term "low material" as originally filed, especially given the confusion as to what the term "low material" requires in the first place. (3) As to the Abstract, it is the Examiner's position that term "material-deficient zones" contains new matter, for the reasons discussed in section (2) above. (4) As to the objection to the disclosure, the objections above remain as the substitute specification will not be entered. Note the discussion in section (1) above, that a substitute specification is not entered-in-part.

Claim Objections

7. Claim 13 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Independent claim 12 requires "maintaining a process pressure lower than 10,000 Pa" (line 14). Claim 13 depends from claim 12, and claims "wherein the process pressure is lower than 10,000 Pa", which is already required by claim 12.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 12-24 and 28-42 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 12, applicant has provided that at line 16, reference is made to "material-deficient zones". This reference are new matter. It does not correspond to the previously described "low material" transitional zones (which as previously noted was confusing as to what the term meant).

The other dependent claims do not cure all the defects of the claims from which they depend.

In the amendment of December 18, 2007, applicant argues that as to the “material-deficient zone”, it is not new mater for the reasons discussed above. The Examiner disagrees. The term has a different meaning than “low material”, and applicant has provided no showing as to why one of ordinary skill in the art would understand that this is what is meant by the term “low material” as originally filed, especially given the confusion as to what the term “low material” requires in the first place.

10. The rejection of claims 12-42 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is withdrawn due to the clarification of the claims in the amendment of December 18, 2007.

Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d

2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 12-24 and 28-42 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 14-34 of copending Application No. 10/835,358 in view of Muehlberger (US 5853815). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of 10/835,358 provide overlapping requirements as to the claims including the injection of coating material into a plasma, partial or complete evaporation of the coating material, and the controlling of process parameters. While the claims of 10/835,358 does not teach the substrate material, layer features and low pressure plasma features, Muehlberger teaches that a conventional system for plasma production for coating is a low pressure plasma spraying system for coating metallic substrates with a pressure of desirably 0.001 to 10 Torr (0.133 to 1333 Pa). Column 7, lines 20-50 and column 8, lines 50-55. The plasma gas can include Ar/He mixtures. Column 10, lines 20-30. The gas flow can be 267 SCFH or 126 SLPm. Column 10, lines 20-30. The powder delivery can be 2.61 lbs/hr or 19.71 g/min. Column 10, lines 50-55. The coating can be from multiple layers. Column 10, lines 55-65. The coating can be

0.0011 inch thick (approx. 27 microns). Column 11, lines 1-5. The particle size can be 5-8 microns. Column 10, lines 50-55. It would have been obvious to one of ordinary skill in the art to modify 10/835,358 to use the low pressure plasma system and features as suggested by Muehlberger to provide the plasma with an expectation of desirable results, because 10/835,358 teaches treating performing a coating and evaporation process where particles can be injected into a plasma, and Muehlberger teaches a conventional plasma system for coating. As to the multilayers and heat insulation and bond coat layers, the Examiner notes that 10/835,358 teaches at claim 22 the use of materials well known in the art as bond coat and heat insulation materials and also teaches substrates of turbine vanes (claim 34) and furthermore it is the Examiner's position that it is well known in the art to apply such materials to gas turbine components.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

13. Applicant argues in the amendment of December 18, 2007 that as to the provisional obviousness-type double patenting rejection that a timely filed terminal disclaimer may be used to overcome the provisional rejection and that they are prepared to file a terminal disclaimer should the need arise when one or the other of the applications has allowed claims.

The Examiner maintains the rejection, because, while a terminal disclaimer was referred to, one has not yet been filed.

Claim Rejections - 35 USC § 102

14. The rejection of claims 12-13, 16-22, 25 and 33 under 35 U.S.C. 102(b) as being anticipated by WO 96/06200 (hereinafter '200) is withdrawn due to the amendment of December 18, 2007 putting the features of previous claims 26 and 27 in independent claim 12.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. Claims 12-13, 16-24, 28, 29 and 33-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 96/06200 (hereinafter '200) in view of Zheng (US 5817372).

Claim 12: '200 teaches a method of forming a coating on a substrate using a low pressure plasma spray, using a coating in the form of a powder beam for spraying onto a surface of a substrate. Figure 1 and pages 6-10. The plasma spray is operated to produce a plasma stream which delivers the coating material to the substrate. Figure 1 and page 10. The operating includes introducing plasma gas into a plasma gun to establish plasma gas operating conditions. Page 9. '200 does not specifically teach that at least 5 wt% of the particles or evaporated, or that conditions are controlled to provide an anisotropic columnar microstructure, however, '200 provides coating materials and conditions that overlap with that taught by applicant to provide such results. Therefore, it would be inherent that the vaporization and anisotropic structure would occur, or at least occur when the taught process conditions are optimized from the given ranges. For example, '200 teaches that the powder can be a ceramic oxide. Page 19 (claims 12-13). The powder conveying rate can be 30 g/min (within the ranges of claims 21-22). Page 9. The process pressure can be 399.96 to 666.6 Pa (within the ranges of claims 12-13 and 16-17). Page 8. The gas flow rate can be of a mixture of inert gases having a total flow rate of 54 SLPM, for example (~ 30 SLPM argon and 24 SLPM helium), and the

volume ratio can be in the range of 2:1 to 1:4 (as in claims 19-20). Page 9. The power can be anything greater than 40 kW (as in claim 18). Page 8. The particle size can be 3-10 microns. Page 9.

Claims 13, 16, 17: The process pressure can be 399.96 to 666.6 Pa. Page 8.

Claims 18: The power can be anything greater than 40 kW. Page 8.

Claims 19-20: The gas flow rate can be of a mixture of inert gases having a total flow rate of 54 SLPM, for example (~ 30 SLPM argon and 24 SLPM helium), and the volume ratio can be in the range of 2:1 to 1:4. Page 9.

Claims 21-22: The powder conveying rate can be 30 g/min. Page 9.

Claims 23-24: '200 provides a moving plasma defocused beam. Pages 6-7 and figure 1.

Claim 33: the coating would be inherently heat insulating as a ceramic oxide layer would be applied over it, which would provide at least some degree of insulation. Page 19 (claims 12-13).

'200 teaches all the features of these claims rejection above, except for the movement of the substrate (claims 23-24), the laser scattering to determine particle size (claims 12, 28), the spray drying to make the particles (claim 29), the use of zirconia (partly or fully stabilized) (claim 12) and the thermal barrier features (claims 34-39).

However, Zheng teaches that it is desired to apply a thermal barrier (heat insulating) coating system using a low pressure plasma spray process (vacuum plasma spray). Column 4, lines 5-50. The system includes a substrate that can be a turbine

blade. Column 3, line 60 through column 4, line 10. The substrate can be a nickel or cobalt base alloy. Column 4, lines 5-15. The substrate can have a lower bond coating also applied by low pressure plasma spray. Column 4, lines 45-50. The bond coating can be Me Cr Al Y, with Me being Fe, Co or Ni. Column 4, lines 35-40. The applied system can be heat treated. Column 6, lines 25-40. The ceramic coating can be yttria (the oxide form of yttrium) stabilized zirconia. Column 4, lines 10-20.

It is the Examiner's position that it is well known to determine size distribution of powder particles using a laser scattering or scanning method. It is also the Examiner's position that it is well known to make thermal spraying powders by a spray drying method. As applicant has not traversed these positions from the Office Action of August 29, 2006, they are understood to be admitted prior art as per MPEP 2144.03(C).

It is further the Examiner's position that it is well known in the thermal spraying art for the bond coating of a thermal barrier coating to be 25-150 microns thick. As applicant has not traversed this position from the Office Action of August 29, 2006, they are understood to be admitted prior art as per MPEP 2144.03(C).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify '200 to check the size of the particles using a laser scanning or scattering method in order to confirm that the desired size was present as it is well known to determine size distribution by such a method and a specific range of particle sizes is desired. It would further have been obvious to modify '200 to use

powders made by a spray drying method as this is a well known method in the art to make powders for thermal spraying. It would further have been obvious to modify '200 provide that the substrate is moved with rotational or pivotable movements relative to the plasma beam with an expectation of desirable coating results, because '200 provides movement of the substrate and plasma beam and this relative movement would provide the same conditions as if the substrate is moved rotationally or pivotably. It would further have been obvious to modify '200 to apply a thermal barrier coating including a bond coating and yttria stabilized zirconia coating to a turbine blade with a nickel or cobalt base alloy substrate and then to heat treat the system as suggested by Zheng in order to provide a desirable coating system as '200 teaches using a low pressure plasma spray system for ceramics and Zheng teaches that it is desirable to use low pressure plasma spray to provide a thermal barrier coating system including a bond coating and yttria stabilized zirconia coating to a turbine blade with a nickel or cobalt base alloy substrate and then to heat treat the system. The coating would be columnar as '200 would provide such a coating as discussed with regard to claim 12 above. It further would have been obvious to modify '200 in view of Zheng to perform the coating of the layers in a single work cycle to provide efficient coating because both layers are applied by low pressure plasma spray. It would also have been obvious to modify '200 in view of Zheng to provide the bond coating thickness in the range of 25 to 150 microns with an expectation of desirable coating results because bond coats are conventionally of that thickness.

18. Claims 14-15 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over '200 in view of Zheng as applied to claims 12-13, 16-24, 28, 29 and 33-39 above, and further in view of Muehlberger (US 5853815).

'200 in view of Zheng teaches all the features of these claims except for the coating thickness from a plurality of layers (claims 14-15) and the heating (claims 30-32).

However, Muehlberger teaches a plasma spray system for forming coatings of metallic oxides or other materials on metallic substrates. Column 1, lines 10-15. The system provides for low pressure plasma spraying where powder beam source is mixed with and becomes entrained with the plasma stream, where the powder particles heat to near melting. Column 7, lines 20-30 and column 8, lines 30-55. In such a system, a pressure of desirably 0.001 to 10 Torr (0.133 to 1333 Pa) is used. Column 7, lines 20-50 and column 8, lines 50-55. The power used can be up to 100 kW, including 84.6 kW. Column 10, lines 15-30. The plasma gas can include Ar/He mixtures. Column 10, lines 20-30. The gas flow can be 267 SCFH or 126 SLPM. Column 10, lines 20-30. The powder delivery can be 2.61 lbs/hr or 19.71 g/min. Column 10, lines 50-55. The coating can be from multiple layers. Column 10, lines 55-65. The coating can be 0.0011 inch thick (approx. 27 microns). Column 11, lines 1-5. The particle size can be 5-8 microns. Column 10, lines 50-55. An additional heat source can be provided to preheat the particles to a predetermined temperature before injecting. Column 9, lines 15-30.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify '200 in view of Zheng to optimize coating thickness based on the final product desired and use multiple layers to provide the thickness as suggested by Muehlberger in order to provide an optimal coating thickness as '200 in view of Zheng teaches using a low pressure plasma spray system and Muehlberger teaches that multiple layers can be put down of various thickness when using a low pressure plasma spray system to provide the final thickness. It would further have been obvious to modify '200 in view of Zheng to provide an additional heat source and optimize its temperature range based on the coating to be applied as suggested by Muehlberger in order to provide an optimum coating as '200 in view of Zheng teaches using a low pressure plasma spray system and that a heating process can be used before and after (pages 7-8 of '200) and Muehlberger teaches that it is desired to provide an additional heat source to preheat the particles, for example, when performing low pressure plasma spraying.

19. Claims 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over '200 in view of Zheng as applied to claims 12-13, 16-24, 28, 29 and 33-39 above, and further in view of Hasz et al (US 5660885).

'200 in view of Zheng teaches all the features of these claims except for the use of the cover coating.

However, Hasz teaches that after a thermal barrier coating of zirconia is applied, it is desirable to apply a top coating of a protective oxide. Column 1, lines 5-25. The coating can be smoother based on the methods that can be used to apply. Column 4, lines 15-25. The coating can be 1 mil thick (approx. 25 microns). Column 6, lines 5-20. The coating can be similar to the zirconia as it can be another metal oxide. Column 3, lines 60-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify '200 in view of Zheng to apply a protective coating as described by Hasz in order to provide a desirable coating system as '200 in view of Zheng teaches using a low pressure plasma spray system to apply a thermal barrier coating system and Hasz teaches the desire to protect such a system by applying a protective layer on top.

20. The Examiner notes that WO 96/06200 was provided in applicant's Sept. 30, 2004 IDS.

Response to Arguments

21. Applicant's arguments filed December 18, 2007 have been fully considered but they are not persuasive.

Applicant merely argues that neither '200 nor a hypothetical combination of '200 and Zheng disclose or suggest every element of amended independent claim 12, and

the dependent claims are directed to specific features of the present invention which are patentable in their own right and that these claims are further allowable because they depend from allowable patent claims (page 11 of the response).

The Examiner has reviewed these arguments, however, the rejection is maintained. Every feature of the claims is suggested as set forth in the rejections above. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Since no specific feature is pointed out as not being suggested by the combination of the references as set forth by the Examiner, the Examiner maintains her positions set forth in the rejections above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/
Primary Examiner, Art Unit 1792